TRANSPLACENTAL TRANFER OF PERSISTENT ORGANIC POLLUTANTS IN HUMANS

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Background and Aims: Transplacental transport of Organohalogen Compounds (OHs) from mother to fetus occurs during pregnancy. Fetuses are more sensitive to environmental pollutants than adults and early exposure may lead to severe repercussions for the newborn health. However, the mechanisms of OHs transference are still not well understood.
Methods: The present study included 477 mother-infant pairs from a population-based cohort in Valencia, Spain, as part of the INMA (Environment and Childhood) project. We measured levels of organochlorine pesticides (OCPs) polychlorinated biphenyls (PCBs) and polybromodiphenyl ethers (PBDEs) in maternal and cord serum samples collected during 2004-2006.
Results: OHs profiles showed very similar distributions in maternal and cord serum. Concentration ratios of OHs between paired samples varied between 0.40 and 0.94 on fresh weight and between 0.89 and 1.86 on lipid basis. In general, fresh weight cord concentrations of OHs were lower than in maternal serum, but when adjusted on lipid-basis cord concentrations were similar or even slightly higher than in mothers. Spearman correlations between mother-cord paired serum samples ranged from very weakly negative to strongly positive (Spearman rho= -0.01 to 0.71), we observed positive and significant correlations for concentrations of PCBs and OCPs while BDE congeners were not correlated.
Conclusions: Differences in lipid content between maternal and cord serum seem to be affecting the distribution of OHs; the lipid content of fetal cord blood is low, thus its potential to accumulate OHs is also limited. When concentrations are lipid adjusted, they are about the same in the maternal-fetal system and so the placenta barrier does not prevent OH exchange. The variations observed in concentration ratios of the different OHs analyzed are likely due to dissimilar metabolism rates in mother than fetus.